

ISYS1055/1057 Tutorial/Lab Sheet

Relational Modelling 2 – Design

Part A: Notes.

The term Relation can be used to refer to a relation schema as well as a relation instance, and usually meaning of the term depends on the context. Please distinguish the different meaning of term Relation in description below.

Part B: Questions.

1. Regarding the Customers relation of the Rocky Concrete database shown below, answer questions.

Cust_no	Cust_name	Street	Town	Postcode	Cr_limit	Curr_balance
1066	Nevs Nursey	White Hart	Bundoora	3083	500	450
13144	Preston City	High Street	Preston	3072	3000	1000
1776	Di Hunter	Thornton Farm	Whittlesea	3757	500	500
2001	Glads Gladdies	Childs Road	Mill Park	3082	500	0
2002	Mill Park	Betula Ave	Mill Park	3082	1000	300

- (a) Discuss the data redundancy in the Customers relation. Use the relation instance given to show the insertion, deletion and update anomalies incurred by the data redundancy. Note that insertion can be seen as a special type of update.
- (b) List all likely functional dependencies (FDs). Do not include trivial FDs.
- (c) Are there any redundant FDs in your answer to Question (b)? Use the reflexive, augmentation and transitive inference rules to explain.
- (d) Compute the closure for {Town}.
- (e) Compute the closure for {Cust_no}.
- (f) What are the candidate keys for Customers? What are the superkeys for Customers?
- (g) Is Customers in BCNF? Explain your answer.

2. For each of the following relations:

- State any reasonable assumptions or rules, in addition to those already given.
- Give functional dependencies based on your assumptions.
- Discuss if the relation is in BCNF.

- (a) Employee(EmpNo, EmpName, Salary, Project, ProjName, FinishDate). An employee can work on more than one project at a time.
- (b) Student(StudNo, StudName, CNo, CTitle, Result, StaffID)

3. Download the file *Rocky-complete.sql* from Blackboard, which defines the relations in the Rocky Concrete database and insert data. In *Oracle SQL*Plus*, complete the following tasks using SQL:

- (a) For the customer where Cust_no=2002, change his/her postcode to 3085.
- (b) Insert the following tuples into the Customers relation.

< 2009, 'Ada Foo', 'Blurr Street', 'Preston', 3011, 300, 0>

- (c) With the updated database, list the postcode for towns. Explain why the result is not sensible.
- (d) From (a)—(c) above, explain why the primary key constraint can not enforce all FDs.